Autonomous Mobile Robots in Hospitals

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Affordable Health Care.
A Better Life.
For All.
• Health care spending
  • $2.8 trillion in 2012, est. $3.5 trillion in 2016
  • U.S. 2012 health spending close to 18% GDP
• Wider coverage
  • Affordable Care Act (ACA) will add 34 million people over 10 years
• Better and more expensive care
• Labor shortage drives up cost
  • In 2010 56% of health care dollars were spent on labor
• Aging population
  • By 2030, the number of elderly covered by Medicare will leap to 78 million, due to the massive number of Baby Boomers entering retirement age.
“It is imperative to work to optimize both patient outcomes and labor productivity.”

New England Journal of Medicine 2011
Extending Hospital Information Systems

- Improve
  - Patient Service
  - Quality of Care
  - Operations Efficiency
  - Business Results

Consulting
Integration

Clinical

Infection Surveillance

Operating
Logistical Robots

Process Improvement

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“Moving Stuff Around”

- Warehouse and Loading Dock
- Patient Care
“Moving Stuff Around”

Warehouse and Loading Dock

Patient Care
“Moving Stuff Around”

Warehouse and Loading Dock

Patient Care
AGVs

- 1953 first ‘driverless vehicle’ by Barrett Electronics: a tow truck follows a wire in the factory ceiling instead of a rail
- Sensing path from infrastructure to natural features: From guide tape, to buried wires and magnets, to laser and vision
- Deployed in hospitals, but limited largely to restricted areas and for heavy duty moving

BA Systems
JBT ATLIS
SwissLog TransCar
Hospital Autonomous Mobile Robots

- Helpmate
- Aethon TUG
- Panasonic Hospi
- SwissLog RoboCourier
- Vecna QC Bot
- RobCab
2011 Service Robot Sales
Were are the Health Care Bots?

**Consumer**
- Entertain: 841,000
- Domestic: 1,700,000

# 2,500,000, $ 0.62B
Sales up 15% over 2010

**Professional**
- Med: 1051
- Other: 1649
- Logistics: 2100
- Field: 5000
- Defense: 6600

# 16,400, $ 3.6B
Sales up 6% over 2010

Source: Int. Federation of Robotics 2011
Hospital AMR

- Automated delivery of items within a hospital
- Integrates with workflows, IT systems, doors, elevators
- Navigates autonomously and safely through hospital
- Secure, accurate tracking of items
- Flexible configuration for different items and tasks
- Works long shifts without breaks
- Provides peak capacity as needed
- On-demand telepresence
- Allows staff to focus on jobs rather than logistics
- Increase in productivity AND patient satisfaction
Hospital AMR Today
Hospital AMR Drivers – “Tailwinds”

- Health Care Cliff
- Hospital Modernization
- Computing, Communication
- Low Cost 2D/3D Sensing
- Manufacturing, 3D Printing “Mass Customization”
- Cloud Computing
Person / Object / Activity Recognition

Place

Writing
Image-Based Location Awareness
Command/Control, UI Apps
Automated Fleet Management
Summary

• Expect to see (though much will be invisible) great changes in your local hospital in the next 5 years
• Big health care productivity boost with robots and automation
• Robotics and automation can become one of the saviors for health care cliff
• Opportunity for the robotics community to have great positive impact on everybody’s lives – make it happen!
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